

DOCUMENT RESUME

ED 235 665

EC 160 824

AUTHOR Trembath, Jack; And Others
TITLE The Milani Comparetti Motor Development Screening Test.
INSTITUTION Nebraska Univ. Medical Center, Omaha. Meyer Children's Rehabilitation Inst.
PUB DATE 77
NOTE 42p.; The Department of Medicine and Physical Therapy also provided assistance in the preparation of the manual.
AVAILABLE FROM Media Resource Center, Meyer Children's Rehabilitation Institute, University of Nebraska Medical Center, 444 S. 44th St., Omaha, NE 68131 (\$6.00).
PUB TYPE Tests/Evaluation Instruments (160)
EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS *Disabilities; *Evaluation Methods; *Infants; *Motor Development; Neurology; Physical Development; *Screening Tests; Student Evaluation

ABSTRACT

The manual describes procedures involved in administering and scoring a neurodevelopmental examination of children from birth to 2 years of age. The test is designed to be easily incorporated into routine health programs. The instrument is easily learned, quickly administered, objectively based, and capable of producing early evidence of neuromotor delay or deficits. Drawings are included along with narrative descriptions of tasks to measure reflexes and motor development. A sample chart used for establishing a profile on the children is appended, and scoring is explained to incorporate the child's age in months. Examples of scoring deviant responses are provided. Repeated testing is advised for key periods during the first two years. A sample profile summary and chart with findings and recommendations are among the appendixes. (CL)

* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *

ED235665

The Milani Comparetti Motor Development Screening Test



Project Director:

Jack Trembath, M.B., B.S., M.R.C. Psych., F.A.A.P.

SPONSORED BY

MEYER CHILDREN'S REHABILITATION INSTITUTE
UNIVERSITY OF NEBRASKA MEDICAL CENTER

OMAHA, NEBRASKA 68131

"PERMISSION TO REPRODUCE THIS
MATERIAL IN MICROFICHE ONLY
HAS BEEN GRANTED BY

Thomas Singarella

EC 160824

**THE MILANI-COMPARETTI MOTOR DEVELOPMENT
SCREENING TEST**

Content Consultants:

Duane Kliewer, R.P.T., M.S.

Wendy Bruce, R.P.T., B.S.

Jack Trembath, M.B., B.S., M.R.C. Psych., F.A.A.P.

Special thanks are due the Departments of Medicine and Physical Therapy of the Meyer Children's Rehabilitation Institute, University of Nebraska Medical Center, for their assistance in preparation of this manual.

©Copyright 1977
Meyer Children's Rehabilitation Institute
University of Nebraska Medical Center
Omaha, Nebraska

5th Printing August, 1981
UNMC Print Shop

TABLE OF CONTENTS

Objectives	1
Introduction	1
Milani-Comparetti Test Procedures	3
Further Notes on Test Procedures	16
Scoring the Milani-Comparetti Motor Development Test	
The Chart	17
Scoring Normal Responses	18
Scoring Deviant Responses	18
Other Observations	22
Summary	23

PREFACE

The need for early identification of developmental delay in children has long been recognized. Yet, most developmental tests, such as those designed by Gesell¹ or Bayley², are not practical for use in ordinary office or clinic practice. Such examinations are so time consuming and require so much training for the testers that they cannot readily be used in routine examination of children. As a result, many health care professionals have come to depend on their own internalized norms or on concerns expressed by parents to alert them to developmental lags. This has become true, despite the fact that "the range of specific skills and abilities in the developing child has such a wide age variance as to almost require that they be measured and evaluated against standardized age norms."³ Thus, there is a real need for a simple, rapid, neurodevelopmental examination which can be easily incorporated into the routine health supervision provided by professionals in private offices and well child clinics.

The neurodevelopmental screening examination developed by A. Milani-Comparetti and E.A. Gidoni is such as examination.^{4,5} It has several advantages:

1. It can be easily carried out in four to eight minutes.
2. It requires no special equipment or setting.
3. It can be learned quickly by physicians, nurses, therapists, and physicians' assistants.
4. Its scoring chart, with easily identified age norms, provides a developmental profile.
5. It can provide early evidence of neuromotor delay or deficits, possibly indicating a need for further evaluation.
6. It relies primarily on objective observations of motor responses rather than parental reporting.

This manual is designed to teach the correct procedures and scoring methods for the exam. However, the reader is encouraged to study the original articles by Milani-Comparetti and Gidoni. The original chart designed by these scientists is included in Appendix A. A modification of this chart developed by the Meyer Children's Rehabilitation Institute staff is found in Appendix B. In this manual and videotape describing the test, the modified chart is used.

The color videotape demonstrating the procedures of the Milani-Comparetti test may be obtained by writing to:

Media Resource Center
Meyer Children's Rehabilitation Institute
444 South 44th Street
Omaha, Nebraska 68131
Telephone (402) 541-7667

Grateful acknowledgement is made to United Cerebral Palsy Associations, Inc., of New York for their assistance in the preparation of both the videotape recording and this manual.

Paul H. Pearson, M.D.
Meyer Professor of Child Health
Director, Meyer Children's
Rehabilitation Institute

References

1. Gesell, A., and Amatruda, C.S. *Developmental Diagnosis*. 2d ed. New York: Hoeber, 1954.
2. Bayley, Nancy. *Manual for the Bayley Scales of Infant Development*. New York: The Psychological Corporation, 1969.
3. Pearson, Paul H. "The Physician's Role in Diagnosis and Management of the Mentally Retarded." *Pediatric Clinics of North America* 15:835.
4. Milani-Comparetti, A., and Gidoni, E.A. "Pattern Analysis of Motor Development and Its Disorders." *Developmental Medicine and Child Neurology* 9:625-630, 1967.
5. Milani-Comparetti, A., and Gidoni, E.A. "Routine Developmental Examination in Normal and Retarded Children." *Developmental Medicine and Child Neurology* 9:631-638, 1967.

OBJECTIVES

This manual and the videotape recording entitled "The Milani-Comparetti Motor Development Screening Test" have been prepared to provide instruction in Milani-Comparetti test procedures and scoring methods. After studying this material, the reader should be able to:

1. Name the key ages for administration of the test.
2. Perform the test procedures, with practice.
3. Identify normal and deviant responses to test procedures.
4. Mark appropriate scores on the forms provided.

INTRODUCTION

The physically handicapped child requires special instruction so that he can learn to take full advantage of the abilities he has. The sooner handicaps are detected, the sooner the child can begin to receive the special training which can help him lead a more productive life.

The Milani-Comparetti Motor Development Test is a series of simple procedures designed to evaluate a child's motor development from birth to about two years of age. Using this test, a physician, therapist, nurse, or physician's assistant can determine in minutes whether one child's motor development corresponds to that of a normal child. When administered several times over a period of months, the test indicates trends in a child's motor development. This information can be used to identify a need for more detailed developmental evaluation.

The attractiveness of the Milani-Comparetti test lies in its simplicity. This test can be conducted effectively on an examining table or floor area with no special equipment. It can be easily and unobtrusively incorporated into the child's routine physical examinations. For children under 12 months of age, repeated examinations are especially valuable in establishing that a problem exists, since developmental problems detected early can be treated early.

The test may be most helpful if conducted at specific intervals. Key ages appropriate for testing are:

1½ to 2 months	15 months
3½ to 4 months	18 months
5½ to 6 months	21 months
9 to 10 months	24 months
12 months	

More frequent testing may be indicated for the child who shows consistent delays, asymmetry, or other abnormal motor development.

Generally, professionals or parents assess a child's level of physical motor, intellectual, social and emotional development by comparing the child's behavior and performance with generally recognized "norms." Yet, it is impossible to say that any behavior is normal or abnormal in all circumstances. Because motor development occurs gradually, there can be no absolute determinations that a given response is normal or abnormal for a particular age. Nevertheless, the concept of "normal" is valuable in providing grounds upon which to base judgments and subsequent actions. There may well be no cause for alarm if a child deviates slightly from what is indicated as normal, but a persistent deviation can point up a need for additional attention in a particular area.

Behavior or responses which deviate significantly from the normal are possible, and they can be serious. If such deviations do appear, or if deviations persist over an extended time, the examiner should request more extensive tests to confirm or deny any apparent abnormality.

MILANI-COMPARETTI TEST PROCEDURES

Originally, Milani-Comparetti and Gidoni presented their testing procedure and scoring chart with the statement that further modification might be beneficial after use and review by other professionals. The Meyer Children's Rehabilitation Institute staff has developed the modification presented here to permit smoother, more rapid administration of the test. All of the original test procedures and scoring mechanisms are retained; they are simply placed in a different order for more efficient testing.

To assess the child's reflexes and degree of motor control, follow the procedures described in this section of the manual. Drawings are included to show the positions of the child for specific tests and the reactions of a normal child to given stimuli. The following section contains instructions for use of the scoring chart.

When testing, note the state of the child just before and during the exam. Is he alert, cooperative, or crying? Did he have to be awakened, or was his bottle taken away? Also note environmental influences such as the temperature of the room. Such factors may influence a child's responses. An irritable child may resist some of the test procedures. In such cases, you must rely on information provided by the person who brings the child for examination. You might indicate on the scoring sheet that a child was resistant and untestable on certain items. Future tests when the child is more cooperative may confirm or deny deviant findings.

Body Lying Supine

Lay the child on his back and observe the movement of his head. Normally, a child at 5 months of age lifts his head forward as he anticipates being pulled up to sitting (Figure 1).



Figure 1. At 5 months, the baby voluntarily lifts his head from supine.

Body Pulled Up From Supine

While the child is in the supine position, grasp his forearms and gently pull him to a sitting position. As you pull, watch the child's head, neck and shoulders. Normal reactions, shown in Figure 2, are:

Younger than 4 months — head remains back or "lags" to varying degrees.

4 to 5 months — head is kept aligned with body.

5 months or older — the head leads the body, and the shoulders and arms flex in an effort to collaborate with the examiner.

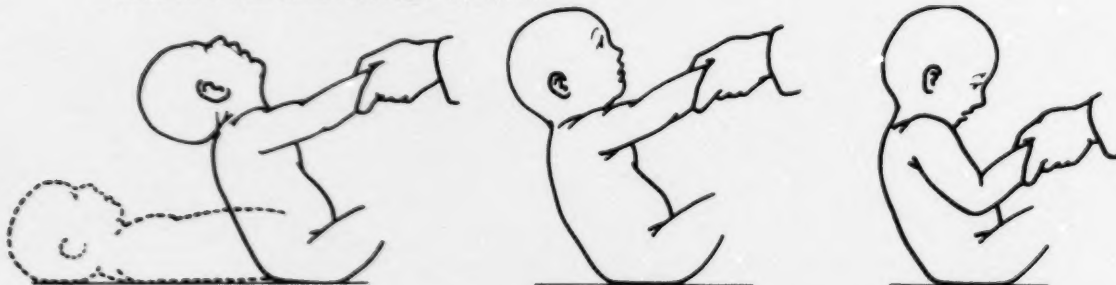


Figure 2.

Younger than 4 months,
the head lags behind
the body.

4 to 5 months, child keeps
head in line with the body.

5 months or older,
head leads the body.

Sitting Posture

Place the child in the sitting position and look at the curvature of his back. The line drawings on the scoring chart give guidelines to expected development at different ages. Normal responses are:

Younger than 4 months — completely rounded back.

4 months — extension or straightening of back to the level of the third lumbar segment (indicated by L3 on the chart).

6 months — extension or straightening upper and lower back, and propping forward with hands.

7 months — sitting independently without propping, though posture may be unsteady.

8 months — sitting erect with no difficulty.

Sideways Parachute

Parachute reactions are protective responses to sudden disruption of balance.

A parachute response is an automatic extension of the limbs.

THE BABY MUST HAVE GOOD HEAD CONTROL BEFORE ANY OF THE PARACHUTE RESPONSES ARE TESTED.

To check the sideways parachute response, begin with the child in the sitting position, holding him firmly at the waist. Quickly but firmly tip him to the side to see whether he extends his arm to catch himself as his balance is disrupted.

After the age of 6 months, a normal child tries to protect himself from falling by extending his arm and open hand, as shown in Figure 3. This reaction is usually not seen before the age of 6 months.



Figure 3.

Sideways parachute,
initial position.



Normal reaction

Backwards Parachute

Again holding the child in a sitting position, tip him gently backwards. Usually a child 9 months or older reacts to the sudden imbalance by either extending both hands behind him or rotating to one side to catch himself with his hand. (Figure 4).

Do not test this reaction in a child who does not have good head control to avoid rapid flexion and extension of the neck.

Figure 4.

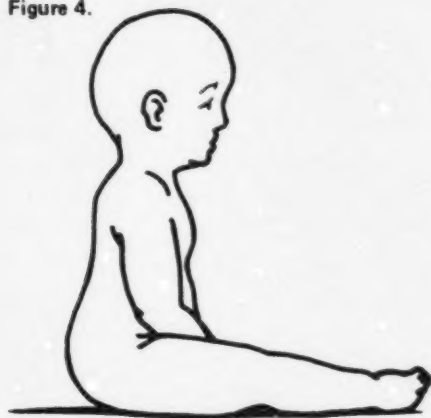


Figure 4A. Initial testing position, backwards parachute

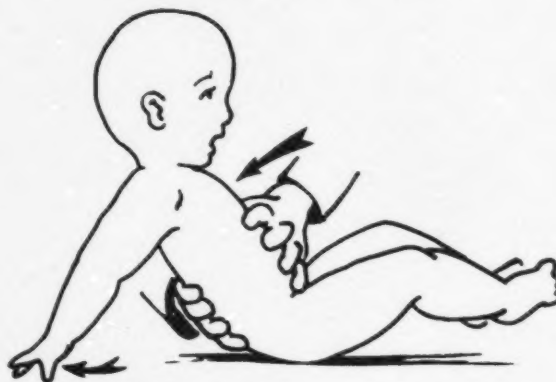


Figure 4B. Normal reaction, extending both arms backward.



Figure 4C. Normal reaction, turning to one side

Body Held Vertical

This is one of several procedures designed to demonstrate the ability of the child to control his head. Place your hands at mid-trunk level well below the axilla to prevent shoulder elevation. Lift the child to a vertical position with his legs suspended in the air. Note the position of the child's head. A 1-month-old child is usually unable to control his head, but gradually, by the age of 4 months, he develops full head control, maintaining the head in midline.

Head in Space

Continuing to hold the child in vertical suspension, tilt him slowly first to the left, then to the right. Continue tilting him slowly forward, then backward. Be careful not to let the head fall back suddenly. For an infant with poor head control or a premature newborn, be careful to prevent hyperextension of the neck when tilting the child backward.

When tilted, the child should try to adjust his head so that it remains upright regardless of body position, with the eyes and mouth horizontal and the nose vertical. Observations indicate that this reaction normally begins to appear at about 1½ months of age and is complete by 4 months. Figure 5 shows head in space reactions.



Figure 5A
Initial testing position,
head in space



Figure 5B
Normal reaction
to sideways tilting.



Figure 5C.
Normal reaction
to forward tilting.



Figure 5D.
Normal reaction
to backward tilting.

Downward Parachute

The test for the downward parachute response should be attempted only after the child has demonstrated head control.

First lift the child vertically some distance from the examination table. Once his legs are somewhat flexed, lower him rapidly 2 to 3 feet so that he gets the feeling of falling. If no response is elicited by lowering to the table top, lower the child to the floor. The normal child at about 4 months of age reacts by straightening and spreading his legs and turning his feet outward (Figure 6).

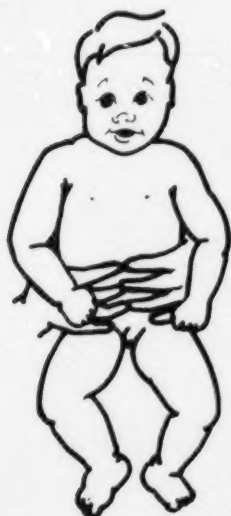


Figure 6

Initial testing position,
downward parachute.



Normal response

Standing

To test the child's ability to stand, hold him upright above the examining table. Then lower him slowly so that his feet touch the table. Notice whether the child can support his weight well. Normal development of this ability is:

5 months — able to support own weight; legs are semi-flexed.

8 months — able to stand with support, with trunk slightly forward and hips flexed.

10 months — able to stand erect with support.

12 months — able to stand independently.

The shaded area of the chart represents primitive supporting reactions present at birth but absent by about 2½ months of age. Test for these primitive supporting reactions by holding the child upright and letting his feet touch the top of the table so that he supports at least part of his weight. Usually a child younger than 2½ months immediately stiffens his legs in extension. This is called "positive supporting." If the child is between 2½ and 5 months of age, his legs may collapse as you lower him toward the table. This inability to support weight is called "astasia," as noted on the scoring chart.

Locomotion

If the child can support his own weight stiffly, try to elicit a stepping reaction by shifting his weight slightly from side to side and tilting him forward. Automatic stepping usually disappears when the child is 1½ to 2 months old.

Next, let the child lie on his back, preferably on the floor, and observe his movements. At the age of 4 to 6 months, a child can usually roll over. If rolling is not observed in the exam, ask the mother whether the child rolls from stomach to back (the usual first direction), from back to stomach, or from back to side. Determine whether he rolls to both right and left sides.

A normal child, by approximately 12 months, begins to walk with hands at shoulder level or above to balance himself and to protect himself from falls. This stance is called walking with "high guard." As the child matures, he gains confidence and gradually lowers his arms to a medium position, called "medium guard." Finally, he walks with hands at his sides, called "no guard." This sequence usually occurs between the ages of 12 and 21 months.

The abbreviation "recip. mvts." on the chart stands for "reciprocal movements." The term refers to the establishment of a more advanced gait pattern in which the opposite arm and leg swing together in the gait sequence.

Foot Grasp

Hold the child upright at the trunk so that his feet touch the tabletop. If the child is less than 9 months old, he usually grasps at the tabletop with his toes (Figure 7). After 9 months, the response is usually absent.



Figure 7 Between birth and 9 months, the toes grasp when the foot contacts a surface.

Body in Sagittal Plane (Landau Response)

Suspend the child in a prone position by supporting him under the upper abdomen with the palm of your hand, as shown in Figure 8. Note the position of the child's head, trunk and legs. Normally, a child from the age of 2 to 3 months onward tries to straighten his body. This extension develops cephalocaudally, and is usually complete at 4 to 6 months. By 6 to 7 months or older, the child can voluntarily inhibit the response.



Figure 8 Child suspended in the prone position.

Forward Parachute

Like the other parachute reactions, this should not be tested until the child has demonstrated head control!

Hold the child firmly at mid-trunk level, with his back to you. Suspend him vertically above the table, then tilt him forward suddenly. A normal child reacts by straightening his arms in front of him and extending his fingers (Figure 9). You may observe this reaction in children as young as 7 months. Asymmetry in the upper extremities can be detected in this maneuver.



Figure 9A. Initial testing position, forward parachute.

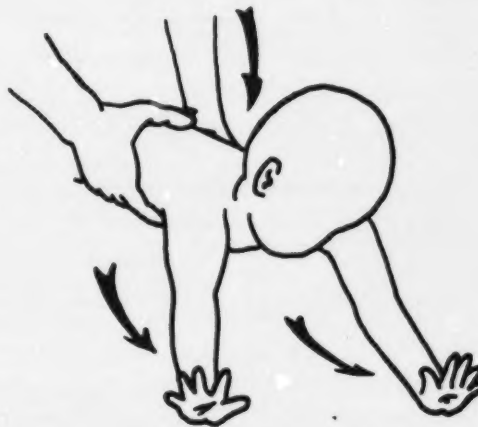


Figure 9B. Normal reaction.

Body Lying Prone

Lay the child on his stomach and again watch for head movement. Figure 10 shows the degree of head control that a child should be able to demonstrate at 2, 4 and 6 months of age.



Figure 10

2 months — head in line with body.



4 months — head elevated about 45 degrees



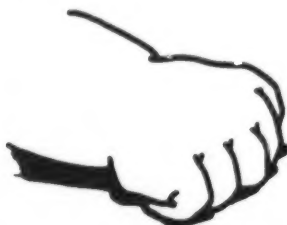
6 months — head elevated about 90 degrees

Hand Grasp

With the child lying prone, be sure that his hands are touching the examination table. Until the age of about 3½ months, the child's hand assumes the fisted position while it is in contact with the tabletop (Figure 11).

Figure 11

Hand grasp response,
normal until age 3½ months.



All Fours

"All fours" as listed on the chart, refers not to the position of the child for the examination, but rather to the child's ability to assume the all-fours position. To evaluate this category of postural control, lay the child on his stomach. As illustrated in Figure 12, the pattern of motor development in this area is normally:

3½ months – Child is able to support part of his weight on his forearms.

5 months – Child is able to support himself on his hands.

7 to 9 months – Child can assume the hands and knees position.

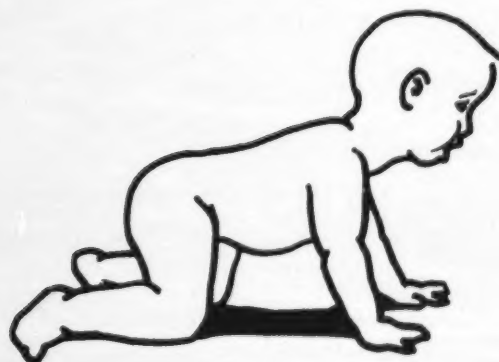
10 to 12 months – Child can assume a hands-and-feet position referred to on the scoring chart as "plantigrade." This later develops into the ability to stand from the center of the floor.



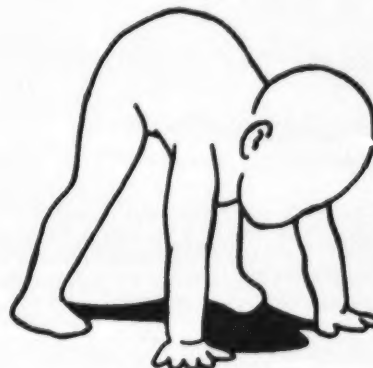
Figure 12 3½ months – child
props on forearms.



5 months – child supports
self on hands.



7 to 9 months – child
on hands and knees.



10 to 12 months – child in
plantigrade position on
hands and feet.

Symmetric Tonic Neck Reflex

If you are testing a child older than 6 months, place him in the all fours crawling position. Then, with your hand on his forehead, gently lift his head while supporting him under the trunk. The symmetric tonic neck reflex is seen when the child flexes hips and knees under him as if to sit on his feet, while extending his neck and arms (Figure 13). This reflex disappears when the child can lift his buttocks from his heels without flexing his neck or arms, or when he is able to crawl reciprocally on hands and knees.

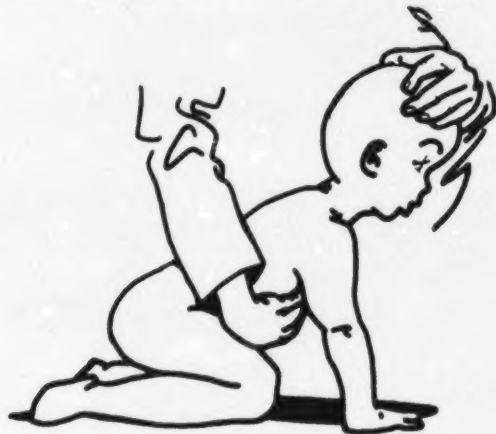


Figure 13

Body Derotative

"Derotation," as the term implies, means untwisting. Place the child in the supine position and flex one hip and knee across his body in a motion similar to cranking. A child younger than 4 months "log rolls," with the body rolling as a unit. After 4 months, the child actively untwists segmentally to the prone position. (Figure 14)

The body derotative response should be tested both to the right and left.

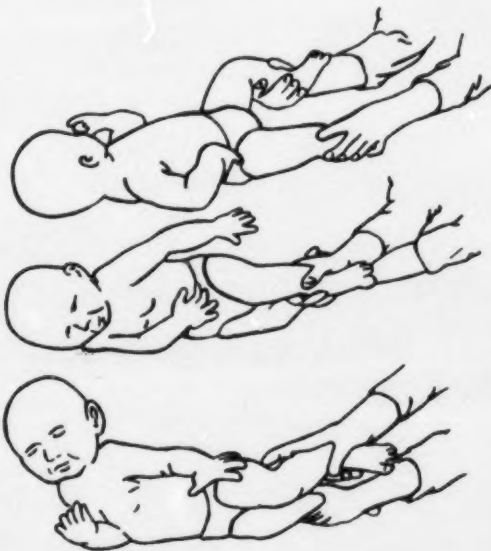


Figure 14

Body Derotation

Standing Up From Supine

With the mother standing nearby to reassure the child and to act as a motivator, place the child supine on a covered floor. From this position, a normal 9- to 11-month old child rolls over onto his stomach and pulls himself to standing, using either his mother or objects in the room for support.

At 12 to 15 months, the child should be able to stand without the aid of objects. He does this by first assuming a position on hands and feet with buttocks resting on his heels. Then he lifts his hips, assuming the plantigrade position, and straightens into a standing position, all without support.

When standing up from supine, a 3½-year-old child commonly partially rotates the trunk on the pelvis, flexes hips and knees, props with the hand on the side toward which he has rotated, and then comes to standing.

Body Rotative

The body rotative reactions require no contact with the child. A child 9 months or older performs a series of movements to get into a different position. At 9 months, the child, upon awakening, pulls himself up to a standing position in the crib. Since this cannot be observed in the examination, the mother should be asked whether the child pulls to stand in the crib.

Asymmetric Tonic Neck Reflex (ATNR)

First, place the child on his back. Keeping his neck in line with his body and stabilizing his trunk with one hand, gently turn his head to one side. Holding this position for about 10 seconds, watch the child's arms. When the head is turned to the left, for example, a normal infant responds by flexing his right elbow and straightening the left arm as shown in Figure 15. The relative increase in flexion of the arm on the skull side shows the presence of the response.

The ATNR is usually present in infants 1 to 4 months old.

Figure 15



ATNR, initial position

ATNR, normal response

Moro Reflex

The procedure described here is modified from the original description to avoid any unnecessary sudden extension of the baby's neck.

Cradle the child in a semi-reclined position of about 45 degrees. Be sure to support his head with your hand. Keeping your hand and forearm under his head and trunk, quickly drop his entire body downward and back. The sudden loss of support should produce a good Moro response without letting the baby's head fall back unsupported.

The baby responds by extending his arms from the body and quickly opening his hands and fingers (Figure 16). This maneuver is excellent for early detection of asymmetry in the upper extremities. The response should disappear at approximately 4 months of age.



Figure 16A.
Initial position
for testing Moro
reflex.



Figure 16B.
Moro reflex.
Extended arms, open hands
and fingers.

Tilting Reactions

The final group of reactions, the tilting reactions, are not routinely tested in office examinations because they require the use of a tilt board or a table that can be tilted. Certainly, the tilting reactions should be evaluated in any examination which appears questionable or in which there is a suspicion of abnormal motor development. In these reactions, the examiner should note curving of the spine only. Reactions of the limbs are not significant in the tilting procedures on young children, since limb reactions are difficult to distinguish from those of similar parachute reactions.

In the drawings that follow, stick figures are used to illustrate the curvature of the trunk in these reactions.

Prone Tilting Reaction

Lay the child on his stomach, and carefully raise one side of the table. The normal child tries to compensate by curving his spine with the concavity toward the raised side of the table (Figure 17). The arms and legs should abduct away from the body. Conduct this test so that the child curves his spine first to one side and then to the other.

The reaction usually appears in children 5 months and older.

Figure 17
Prone Tilting Reaction



Supine Tilting Reaction

Turn the child over onto his back. Lift the edge of the table parallel to the child's side. He should again attempt to compensate by curving his spine up toward the raised side of the table, with extremities extending outward (Figure 18). Test both the right and left sides.

The ability to curve the spine in the supine position usually appears at about 7 months of age.

Figure 18
Supine Tilting Reaction



Sitting Tilting Reaction

Place the child in a sitting position on the table with his back to you. Lift the edge of the table first on one side, then the other. Again, the normal child tries to compensate by curving his spine sideways with the concavity toward the raised side and extending extremities away from the body (Figure 19).

The sitting tilting reaction develops later than either the prone or the supine reaction. It is unlikely that a child younger than 7 months will demonstrate this reaction. The reaction usually begins to appear around 7 months and is not fully developed until 8 months.

Figure 19
Sitting Tilting Reaction



All Fours Tilting Reaction

Place the child on all fours facing you and tilt the table slowly from side to side. A normal child reacts by curving his spine with the concavity toward the raised side of the table (Figure 20). Again, be sure to test in both directions. Normally, a child between the ages of 8 and 12 months begins to show signs of reacting to this test.

Figure 20
All Fours Tilting Reaction



Standing Tilting Reaction

As the child stands unsupported on the table with his back to you, carefully lift one side of the table. Watch the child closely to see whether he curves his spine, again with the concavity toward the raised side, to compensate for the tilted surface. (Figure 21).

The standing reaction develops even more gradually than the sitting and all fours tilting reactions. The standing reaction begins to appear at 12 months and is usually fully developed by the age of 21 months.

Figure 21
Standing Tilting Reaction



FURTHER NOTES ON TEST PROCEDURES

Testing the Older Child

In their original articles, Milani-Comparetti and Gidoni stated that the testing of a child may commence at the level of motor development that the child has attained. This is based on the assumption that the child reaches higher stages of development through the emergence of some responses and the inhibition of others. Therefore, it is unnecessary to go back and retest responses which have been previously acquired or inhibited.

In testing a child older than 8 months who has acquired some of the basic locomotor skills, we ask the mother's permission to place the child on a rug on the examining room floor. (Of course, this is practical only if the baby is well and the exam room is not a clinic area for sick children.) The child usually responds better on the floor than on a table.

For example, a 10-month-old child placed on his back on the floor usually rolls over to his stomach, gets up on hands and knees, crawls over to his mother, and pulls up to stand at her knee. If the child is put on the floor in a sitting position, his sitting posture as well as change of positions can be seen.

The motor skills observed in such a situation are many of those higher skill levels represented in the Milani-Comparetti test. If the examiner has any doubts about the way the child moves, then testing particular areas is warranted. For instance, if a child shows asymmetrical use of his limbs when getting up at his mother's knee, it would be appropriate to test the sideways, forward, downward and backward parachute responses. If there is any question regarding the development or disappearance of an early response, its test can easily be incorporated into the examination. Generally, this is not necessary if the child has no apparent difficulty in his ability to perform the higher levels of postural control and movement.

When to Omit Tests

A baby should not be put through test procedures above his chronological age when it is obvious that his motor development and age level are not near the age level of the expected response. Generally, we have omitted test items that are in a 1- to 1½-month range above the baby's chronological age. Also, if the baby appears to be generally behind his age level, as is often true of premature infants, we have tried to keep the testing routines within the developmental level of the child.

For example, the sideways parachute reactions are not tested in a 4½-month-old child, since these responses do not usually appear until 6 months. A premature child of 6 months who had been born 2 months early also would not be tested for parachute reactions in most situations.

Each infant is different, so the examiner must make some decisions as to when to test the individual baby for particular test items. The stick figures, words, and shaded areas on the chart provide basic guidelines for the expected age levels at which various responses may be expected.

Obviously, it is not necessary to test a child for responses far below his age level if he appears to be progressing well in motor skills and responses.

All Fours Tilting Reaction

Place the child on all fours facing you and tilt the table slowly from side to side. A normal child reacts by curving his spine with the concavity toward the raised side of the table (Figure 20). Again, be sure to test in both directions. Normally, a child between the ages of 8 and 12 months begins to show signs of reacting to this test.

Figure 20
All Fours Tilting Reaction



Standing Tilting Reaction

As the child stands unsupported on the table with his back to you, carefully lift one side of the table. Watch the child closely to see whether he curves his spine, again with the concavity toward the raised side, to compensate for the tilted surface. (Figure 21).

The standing reaction develops even more gradually than the sitting and all fours tilting reactions. The standing reaction begins to appear at 12 months and is usually fully developed by the age of 21 months.

Figure 21
Standing Tilting Reaction



FURTHER NOTES ON TEST PROCEDURES

Testing the Older Child

In their original articles, Milani-Comparetti and Gidoni stated that the testing of a child may commence at the level of motor development that the child has attained. This is based on the assumption that the child reaches higher stages of development through the emergence of some responses and the inhibition of others. Therefore, it is unnecessary to go back and retest responses which have been previously acquired or inhibited.

In testing a child older than 8 months who has acquired some of the basic locomotor skills, we ask the mother's permission to place the child on a rug on the examining room floor. (Of course, this is practical only if the baby is well and the exam room is not a clinic area for sick children.) The child usually responds better on the floor than on a table.

For example, a 10-month-old child placed on his back on the floor usually rolls over to his stomach, gets up on hands and knees, crawls over to his mother, and pulls up to stand at her knee. If the child is put on the floor in a sitting position, his sitting posture as well as change of positions can be seen.

The motor skills observed in such a situation are many of those higher skill levels represented in the Milani-Comparetti test. If the examiner has any doubts about the way the child moves, then testing particular areas is warranted. For instance, if a child shows asymmetrical use of his limbs when getting up at his mother's knee, it would be appropriate to test the sideways, forward, downward and backward parachute responses. If there is any question regarding the development or disappearance of an early response, its test can easily be incorporated into the examination. Generally, this is not necessary if the child has no apparent difficulty in his ability to perform the higher levels of postural control and movement.

When to Omit Tests

A baby should not be put through test procedures above his chronological age when it is obvious that his motor development and age level are not near the age level of the expected response. Generally, we have omitted test items that are in a 1- to 1½-month range above the baby's chronological age. Also, if the baby appears to be generally behind his age level, as is often true of premature infants, we have tried to keep the testing routines within the developmental level of the child.

For example, the sideways parachute reactions are not tested in a 4½-month-old child, since these responses do not usually appear until 6 months. A premature child of 6 months who had been born 2 months early also would not be tested for parachute reactions in most situations.

Each infant is different, so the examiner must make some decisions as to when to test the individual baby for particular test items. The stick figures, words, and shaded areas on the chart provide basic guidelines for the expected age levels at which various responses may be expected.

Obviously, it is not necessary to test a child for responses far below his age level if he appears to be progressing well in motor skills and responses.

All Fours Tilting Reaction

Place the child on all fours facing you and tilt the table slowly from side to side. A normal child reacts by curving his spine with the concavity toward the raised side of the table (Figure 20). Again, be sure to test in both directions. Normally, a child between the ages of 8 and 12 months begins to show signs of reacting to this test.

Figure 20
All Fours Tilting Reaction



Standing Tilting Reaction

As the child stands unsupported on the table with his back to you, carefully lift one side of the table. Watch the child closely to see whether he curves his spine, again with the concavity toward the raised side, to compensate for the tilted surface. (Figure 21).

The standing reaction develops even more gradually than the sitting and all fours tilting reactions. The standing reaction begins to appear at 12 months and is usually fully developed by the age of 21 months.

Figure 21
Standing Tilting Reaction



FURTHER NOTES ON TEST PROCEDURES

Testing the Older Child

In their original articles, Milani-Comparetti and Gidoni stated that the testing of a child may commence at the level of motor development that the child has attained. This is based on the assumption that the child reaches higher stages of development through the emergence of some responses and the inhibition of others. Therefore, it is unnecessary to go back and retest responses which have been previously acquired or inhibited.

In testing a child older than 8 months who has acquired some of the basic locomotor skills, we ask the mother's permission to place the child on a rug on the examining room floor. (Of course, this is practical only if the baby is well and the exam room is not a clinic area for sick children.) The child usually responds better on the floor than on a table.

For example, a 10-month-old child placed on his back on the floor usually rolls over to his stomach, gets up on hands and knees, crawls over to his mother, and pulls up to stand at her knee. If the child is put on the floor in a sitting position, his sitting posture as well as change of positions can be seen.

The motor skills observed in such a situation are many of those higher skill levels represented in the Milani-Comparetti test. If the examiner has any doubts about the way the child moves, then testing particular areas is warranted. For instance, if a child shows asymmetrical use of his limbs when getting up at his mother's knee, it would be appropriate to test the sideways, forward, downward and backward parachute responses. If there is any question regarding the development or disappearance of an early response, its test can easily be incorporated into the examination. Generally, this is not necessary if the child has no apparent difficulty in his ability to perform the higher levels of postural control and movement.

When to Omit Tests

A baby should not be put through test procedures above his chronological age when it is obvious that his motor development and age level are not near the age level of the expected response. Generally, we have omitted test items that are in a 1- to 1½-month range above the baby's chronological age. Also, if the baby appears to be generally behind his age level, as is often true of premature infants, we have tried to keep the testing routines within the developmental level of the child.

For example, the sideways parachute reactions are not tested in a 4½-month-old child, since these responses do not usually appear until 6 months. A premature child of 6 months who had been born 2 months early also would not be tested for parachute reactions in most situations.

Each infant is different, so the examiner must make some decisions as to when to test the individual baby for particular test items. The stick figures, words, and shaded areas on the chart provide basic guidelines for the expected age levels at which various responses may be expected.

Obviously, it is not necessary to test a child for responses far below his age level if he appears to be progressing well in motor skills and responses.

SCORING THE MILANI-COMPARETTI MOTOR DEVELOPMENT TEST

THE CHART

The scoring chart is a graphic profile of a child's motor development. The sample chart to be used with this manual is found in Appendix B.

The first 12 months on the chart are divided by vertical lines into one-half month increments. The appropriate age in months appears directly above the vertical line. From 12 to 24 months, the chart is condensed into a shorter scale; each vertical line represents 1 month.

The shaded areas on the chart represent the time span when a reflex or reaction is expected to be present. The tapered shaded areas (appearing in the tilting reactions) indicate that these responses emerge gradually within the tapered period.

Unshaded tapered arrows (in the body held vertical and body lying prone tests) indicate that the motor reaction being tested — head control — is acquired gradually.

The stages of development depicted by the stick figures on the chart are explained in the procedures section of this manual. Their positions on the chart serve as guidelines to show the age levels at which postural changes occur in motor development.

In the words printed on the chart, the first letter is aligned vertically with the age at which that motor skill or response usually appears.

The chart used to test a child initially may also be used to score later tests so that relative gains or delays with age can be readily assessed. The date when each test is given is written above the number in months which corresponds to the child's chronological age. However, in testing high-risk babies, a new chart should be used for each test, so that the examiner cannot be influenced by the results of previous tests. Results of all tests may then be combined and transferred to a single form.

Often it is helpful to prepare a narrative summary of special observations made at each testing session. The narratives may be attached to the back of the profile chart for the child, and thus provide a continuing summary of that child's motor development. Examples of some of the summaries prepared at the Meyer Children's Rehabilitation Institute are given in Appendix C.

General Scoring

The child's age in months is used to score each item tested. The scoring number thus remains the same throughout the test; a 5-month-old child will be scored entirely with 5's. The child's actual age is placed in the column corresponding to his performance on each test item. Thus, if a 5-month-old child performs at the 3-month level in one area, a 5 is written on the vertical line headed by the number 3.

In determining a child's age, no allowance is made for prematurity. The number of months since birth is accepted as the child's age for recording. However, length of gestation is considered when interpreting the significance of delays. Experience has shown that premature infants by the age of 10 to 15 months make gains to the point at which their level of development is equivalent to that of a term baby.

When scoring, it is best to avoid ambiguous terms such as "partial" and "incomplete." Most responses should be judged either as absent or present. The only exceptions are the test items indicated on the scoring sheet with tapered arrows, which show emerging reactions.

SCORING NORMAL RESPONSES

If a child's response to a test item is the normal expected for his age, write the age on the vertical line headed by the same number, as shown below.

	1	2	3	4	5	6	7	8
Parachute Sideways							7	

Several of the test items may be difficult to observe directly, especially if the child is uncooperative. In such a situation, the mother can often provide the necessary information. You might ask her such questions as, "Does your baby roll over yet? From his back to his tummy? From tummy to back?" and so on. The mother's answers may be entered on the chart with the notation "mother's report."

	1	2	3	4	5	6	7	8
Locomotion		automatic stepping		4 (mother's rept) rolls over			prone → crawls	supine

SCORING DEVIANT RESPONSES

When performing the test, you should be alert to deviations from the normal. Such deviations may include asymmetry, delay, advance, abnormalities within the response, or a combination of these.

In scoring deviations, place the child's actual age in months on the vertical line headed by the number of months at which the observed response normally occurs. Mark the number that you write with an asterisk. Examples of specific scoring methods are given below. The principles shown in these examples may be applied throughout the scoring.

I. Asymmetry

Both sides of the body should respond equally to each test item. Symmetry should become particularly evident after the fourth month as the influence of the asymmetric tonic neck reflex disappears. However, symmetry can be seen earlier in testing the Moro response. As examples of normal symmetrical responses, the hands open equally in the Moro response, parachute responses prevent falling on both sides, and weight is distributed evenly over both legs in standing.

Examples of asymmetrical reactions, which may be indications of possible hemiplegia, may include a hand grasp or foot grasp on one side that persists beyond the normal time for disappearance, asymmetric posturing of the arms in the Moro response, an absent parachute response on one side, or unequal weight-bearing on one side of the body. A cluster of asymmetries may be more evidence of a problem in this area than is a single asymmetrical response in isolation.

A. Sideways Parachute

In the parachute responses, the child's reactions should be equal on both sides. If the response is present on one side but absent on the other, it should be scored as an asymmetrical response, marked with an asterisk and notation.

	1	2	3	4	5	6	7	8
Parachute Sideways							7*	present (L) absent (R)

B. Head in Space

In the scoring shown in the chart below, the 4-month-old child righted his head when his body was tilted to his left. However, the response was incomplete when the body was tilted to his right. A 4 is placed on the line vertically aligned with 4 months, and the score is marked with an asterisk with notation made of the asymmetry.

	1	2	3	4	5	6	7	8
Head in Space				4*	complete (L) absent (R)			

C. Hand Grasp

A 5-month-old infant normally does not exhibit a hand grasp response. For the child scored in the chart below, one hand demonstrated the appropriate absence of the hand grasp, but the response was present in the other hand. This is an asymmetrical reaction. Because the response on one side was appropriate for the child's age level, his age — 5 months — was placed in the column headed by 5. However, the 5 is marked with an asterisk, and notation is made that the response is present on one side and absent on the other.

	1	2	3	4	5	6	7	8
Hand grasp					5*	present (R) absent (L)		

D. Moro

The Moro reflex is present until about 4 months of age. Extension and abduction of the arms with fully open hands should occur bilaterally. If not, the response is asymmetrical, and the scoring is again marked with an asterisk and a short explanation is made on the back of the chart.

	1	2	3	4	5	6	7	8
Moro			3*	complete (R) absent (L)				

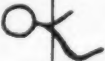
II. Delayed Responses

Many reflexes which are normally present in the first few months of life disappear and become integrated or modified into more complex motor patterns. If a reflex persists 1 month beyond its normal time for disappearance, it signifies a delay in development.

Delay is also indicated if skills which usually appear at predictable age levels do not develop within 1 to 1½ months of that predicted age.

A. Body Pulled Up From Supine

When pulled from supine to sitting, a normal 5-month-old leads with his head flexed forward and pulls with his arms. If the head remains in line with the plane of the body, this is scored at the 4-month level and reported as a delay. A numeral 5 with an asterisk is placed on the sheet.

	1	2	3	4	5	6	7	8
Body pulled up from supine								

5* delayed

B. Sideways Parachute

The sideways parachute response should develop at 6 months. If it is absent on both sides for a 7-month-old, place a 7 in the column just outside the shaded area (in this case, at the 5½ month level). This means that the expected response is delayed and is not complete in either upper extremity. In such situations, score the item as close to the child's chronological age as possible.

	1	2	3	4	5	6	7	8
Parachute Sideways							7	

C. Hand Grasp

If the hand grasp response persists beyond the age of 4 months on both sides, it is scored as a delay, as shown in the chart below. The child's actual age is placed at the end of the shaded area, again as close to his chronological age as possible. Avoid such terms as "partially open"; judge the response as either absent or present.

	1	2	3	4	5	6	7	8
Hand Grasp								

6* delayed

A. Sideways Parachute

In the parachute responses, the child's reactions should be equal on both sides. If the response is present on one side but absent on the other, it should be scored as an asymmetrical response, marked with an asterisk and notation.

	1	2	3	4	5	6	7	8
Parachute							7*	present (L)
Sideways							absent (R)	

B. Head in Space

In the scoring shown in the chart below, the 4-month-old child righted his head when his body was tilted to his left. However, the response was incomplete when the body was tilted to his right. A 4 is placed on the line vertically aligned with 4 months, and the score is marked with an asterisk with notation made of the asymmetry.

	1	2	3	4	5	6	7	8
Head in Space				4*	complete (L)			
					absent (R)			

C. Hand Grasp

A 5-month-old infant normally does not exhibit a hand grasp response. For the child scored in the chart below, one hand demonstrated the appropriate absence of the hand grasp, but the response was present in the other hand. This is an asymmetrical reaction. Because the response on one side was appropriate for the child's age level, his age — 5 months — was placed in the column headed by 5. However, the 5 is marked with an asterisk, and notation is made that the response is present on one side and absent on the other.

	1	2	3	4	5	6	7	8
Hand grasp					5*	present (R)		
						absent (L)		

D. Moro

The Moro reflex is present until about 4 months of age. Extension and abduction of the arms with fully open hands should occur bilaterally. If not, the response is asymmetrical, and the scoring is again marked with an asterisk and a short explanation is made on the back of the chart.

	1	2	3	4	5	6	7	8
Moro			3*	complete (R)				
				absent (L)				

II. Delayed Responses

Many reflexes which are normally present in the first few months of life disappear and become integrated or modified into more complex motor patterns. If a reflex persists 1 month beyond its normal time for disappearance, it signifies a delay in development.

Delay is also indicated if skills which usually appear at predictable age levels do not develop within 1 to 1½ months of that predicted age.

A. Body Pulled Up From Supine

When pulled from supine to sitting, a normal 5-month-old leads with his head flexed forward and pulls with his arms. If the head remains in line with the plane of the body, this is scored at the 4-month level and reported as a delay. A numeral 5 with an asterisk is placed on the sheet.

	1	2	3	4	5	6	7	8
Body pulled up from supine					5* delayed			

B. Sideways Parachute

The sideways parachute response should develop at 6 months. If it is absent on both sides for a 7-month-old, place a 7 in the column just outside the shaded area (in this case, at the 5½ month level). This means that the expected response is delayed and is not complete in either upper extremity. In such situations, score the item as close to the child's chronological age as possible.

	1	2	3	4	5	6	7	8
Parachute Sideways							7	

C. Hand Grasp

If the hand grasp response persists beyond the age of 4 months on both sides, it is scored as a delay, as shown in the chart below. The child's actual age is placed at the end of the shaded area, again as close to his chronological age as possible. Avoid such terms as "partially open"; judge the response as either absent or present.

	1	2	3	4	5	6	7	8
Hand Grasp					6* delayed			

D. Asymmetrical Tonic Neck Reflex

The asymmetrical tonic neck posture normally disappears around the age of 4 months. If it is present in a 6-month-old, it represents a delay in modification of the reflex. Such a delay may prevent the child from rolling over. In scoring a delayed ATNR, the child's actual age is placed on the last vertical line which shows the response's existence.

	1	2	3	4	5	6	7	8
Asymmetrical T.N.						6*		
						delayed		

III. Advanced Responses

Occasionally, a child develops a skill before the predicted age level. A response is considered advanced if it appears 1 month or more before the expected age. Advanced responses are scored by writing the child's chronological age on the line headed by the number indicating when the response is expected. The score is marked with an asterisk to indicate a deviation from normal.

A. Sitting

Normally, a child is able to sit upright, propping himself up with his hands, at the age of 6 months. A 5-month-old who sits supporting himself is advanced in this motor skill. This is scored with a 5 placed on the vertical line headed by 6, and reported as advanced.

	1	2	3	4	5	6	7	8
Sitting						5*		
	e			e		advanced		

B. Locomotion

The chart below represents a 6½-month-old child who is already crawling on all fours. The child's age, 6.5, is placed at the beginning of the word "crawls," and his advanced development is noted with an asterisk.

	1	2	3	4	5	6	7	8
Locomotion								6.5*
	automatic			rolls over				advanced
	stepping							crawls

IV. Combined Responses

Retained and asymmetrical Moro response.

An example of combined deviations in responses to one test item is the child 6 months old who continues to show the Moro response, but consistently with the right hand fisted.

	1	2	3	4	5	6	7	8
Moro					6*	® fisted delayed + asymmetrical		

OTHER OBSERVATIONS

In testing babies with at-risk histories or babies of risk pregnancies, the examiner may see other behavior characteristics that are not part of the Milani-Comparetti screening test. The infant may show facial asymmetry in crying, a tremor in the hand, hypertonia or hypotonia.

Experience indicates that it is best *not* to note such observations on the scoring chart, so that the profile sheet shows only those items which have been specifically tested. However, it is useful to record such behaviors on another sheet which can be attached to the profile form. The attachment might also record limited observations about muscle tone, since it may show considerable variation among babies with differing histories.

An infant who is suspected of showing deviations should be tested several times if possible. The younger the baby, the more difficult it is to draw conclusions about significant deviations. Over subsequent test periods, delays or asymmetrical development becomes more obvious.

Babies who show delays and/or asymmetrical motor development in the early months of life may "catch up" or "even out" near the end of the first year. Any child between 9 and 12 months of age with significant delay and/or asymmetry should be watched closely with closely spaced retesting. Such a child should also be given a neurological evaluation and other developmental assessments. These will help to determine if the child's developmental status warrants early intervention with special training techniques. If so, the family also might be counseled and prepared to accept the idea of early management of the child's handicap, if one is identified.

SUMMARY

The Milani-Comparetti test can be used as a convenient and rapid screening test for motor development of children in the first two years of life. The test examines various stages of motor development in relation to the emergence and disappearance of primitive reflexes and also the sequential development of higher patterns of movement and postural control. We have found the Milani-Comparetti screening test convenient for the following reasons.

1. It can be easily incorporated into the routine office or clinical exam by physicians, therapists, nurses, or physicians' assistants.
2. It does not require specific equipment and thus can be easily administered in almost any type of setting.
3. It takes only a short time to administer (4 to 8 minutes), depending on the age of the child and the experience of the examiner.
4. It depends on predictable responses which are observed by the examiner as he handles the child to elicit these responses. It does not rely as much on the mother's history which may not be interpreted correctly.
5. It is scored graphically on a profile sheet for future comparison with subsequent retests.

The Milani-Comparetti test should be repeated several times during the child's first two years. Key ages recommended for examination are: 1½ – 2 months, 3½ – 4 months, 5½ – 6 months, 9 – 10 months, 12 months, 15 months, 18 months, 21 months, and 24 months. A baby who, in repeated testing, arouses suspicions because of consistent delays, asymmetry, abnormal development, or combinations of these deviations may warrant more frequent examination than the suggested intervals.

Since his physical and emotional state during the examination may influence a child's motor responses, the profile sheet should note the child's general state.

When a child has consistently shown deviant motor behavior on repeated examinations, or shown obviously abnormal responses, a thorough motor assessment and neurological examination should be considered.

APPENDIX A
Original Chart

CHART NO. 1 - ORIGINAL

NAME		DATE OF BIRTH		RECORD NO.														
Months		1	2	3	4	5	6	7	8	9	10	11	12	15	18	21	24	
Spontaneous Behavior	Postural Control	Head	Body held Vertical															
		Body lying prone			lifts													
		Body lying supine					lifts											
		Body pulled up from supine																
	Body	Sitting				L 3												
		All Fours				forearms	hands			4 pt kneeling		plantigrade						
		Standing		Supporting reactions		astasia	takes weight											
	Active Movement	Standing up from supine									with rotation and support		without support		3 1/2 yrs partial rotation		5 yrs none	
		Locomotion	automatic stepping				rolls over			crawls				high medium no guard			runs recip. mvts	
	Months		1	2	3	4	5	6	7	8	9	10	11	12	15	18	21	24
Evoked Responses	Primitive Reflexes	Hand Grasp																
		Asym. T.N.																
		Moro																
		Sym. T.N.																
		Foot Grasp																
	Righting Reactions	Head in Space																
		Body in Sagittal pl.																
		Body Derotative																
		Body Rotative																
		Downwards																
	Parachute Reactions	Sideways																
		Forwards																
		Backwards																
		Prone																
	Tilting Reactions	Supine																
		Sitting																
		All Fours																
		Standing																
		Months	1	2	3	4	5	6	7	8	9	10	11	12	15	18	21	24

APPENDIX B
Modified Scoring Chart
For Use

		CHART NO. 2 - FOR USE																															
		NAME												DATE OF BIRTH												RECORD NO.							
		AGE IN MONTHS																															
		1	2	3	4	5	6	7	8	9	10	11	12	15	18	21	24	1	2	3	4	5	6	7	8	9	10	11	12	15	18	21	24
HEAD	Body lying supine																																
	Body pulled up from supine																																
	Sitting																																
PARACHUTE	Sideways																																
PARACHUTE	Backwards																																
HEAD	Body held vertical																																
	Head in space																																
PARACHUTE	Downwards																																
	Standing																																
	Locomotion																																
	Foot Grasp																																
PARACHUTE	Body in sagittal pl.																																
	Forwards																																
	Body lying prone																																
HEAD	Hand Grasp																																
	All fours																																
	Sym. T.N.																																
	Body Derotative																																
	Standing up from supine																																
	Body Rotative																																
HEAD	Asym. T.N.																																
	Moro																																
	Prone																																
TILTING REACTIONS	Supine																																
	Sitting																																
	All fours																																
	Standing																																
MONTHS		1	2	3	4	5	6	7	8	9	10	11	12	15	18	21	24	1	2	3	4	5	6	7	8	9	10	11	12	15	18	21	24

APPENDIX C
Sample Chart

PROFILE SUMMARY:

Example of a child with some variations and deviations, one that should be watched closely.

HOWE, JAMES

BD: 4/14/74

Date Seen: 1/22/75

Test Used: Milani-Comparetti

Age: 40 weeks (9 months)

State: Alert and happy

Findings: James tested at the 9 month age level except for the following deviations.

1. Body pulled up from supine — head is held even with body (delayed).
2. Body lying supine — child just beginning to lift head (delayed).
3. Sitting in independent but spine forward and not erect (delayed).
4. Downward parachute — L leg present, R leg adducts with foot plantarflexed (asymmetrical).
5. Standing — held standing flexed posture at trunk/hips & stands on R toes, L foot flat (delayed and asymmetrical).
6. Locomotion — child gets up to hands and knees but does not crawl yet (delayed).
7. Foot grasp — R stronger and on toes (asymmetrical).
8. Body derotation — present both sides but R shoulder lags when rotation attempted to child's L (asymmetrical).

Recommendations:

1. Child shows delayed and asymmetrical responses at 9 months. Retest in 6 weeks using Milani.
2. If deviations at 10½ month age level still persist, refer to developmental facility for complete evaluation.

Addendum:

Note — child was 6 weeks premature so this should be a consideration in his profile. Also, the child's mother states she noted James rolled over mostly to one side to get to all fours. Derotation tested asymmetrical also.

State: Alert, happy		CHART NO. 2 - FOR USE		6 wk. premature													
NAME Howe, James		DATE OF BIRTH 4-14-74		RECORD NO. 59028													
AGE IN MONTHS		1	2	3	4	5	6	7	8	9	10	11	12	15	18	21	24
HEAD	Body lying supine					9* lifts delayed											
	Body pulled up from supine	9			9	9* delayed											
	Sitting	9			L3 9	9	9	9	9	9	9	9	9	9	9	9	9
PARACHUTE	Sideways									9							
PARACHUTE	Backwards									9							
HEAD	Body held vertical									9							
	Head in space									9							
PARACHUTE	Downwards									9* 9	9	9	9	9	9	9	9
	Standing				supporting reactions	astasia	Takes weight			9	9	9	9	9	9	9	9
	Locomotion				automatic stepping		rolls over			9	9	9	9	9	9	9	9
	Foot Grasp									9	9	9	9	9	9	9	9
	Body in sagittal pl.									9	9	9	9	9	9	9	9
PARACHUTE	Forwards									9	9	9	9	9	9	9	9
HEAD	Body lying prone				lifts					9							
	Hand Grasp									9							
	All fours					forearms hands				9	9	9	9	9	9	9	9
	Sym. T.N.									N.T.							
	Body Derotative									9	9	9	9	9	9	9	9
	Standing up from supine									9	9	9	9	9	9	9	9
	Body Rotative									9	9	9	9	9	9	9	9
HEAD	Asym. T.N.									9	9	9	9	9	9	9	9
	Moro																
TILTING REACTIONS	Prone																
	Supine																
	Sitting																
	All fours																
	Standing																
MONTHS		1	2	3	4	5	6	7	8	9	10	11	12	15	18	21	24